Amendments to the Claims:

Please amend claims 1, 9, 11, 32, 38, 42, 57, 61, 61, 71, 82, 85 and 88, and add new claims 100-155 as shown in the following listing of claims. This listing of claims will replace all prior versions and listings of claims in the application.

1. (currently amended) A method ~~for high speed transmission of information~~ of transmitting data on an optical channel, the method comprising:

encoding information via a trellis encoder ~~to produce digital multilevel symbols~~;

mapping the encoded information into digital multilevel symbols, wherein the digital multilevel symbols are part of a pulse amplitude modulation (PAM) alphabet comprising at least three symbols;

converting the digital multilevel symbols into analog multilevel signals; and

modulating the intensity of a transmitting light source according to the level of the analog multilevel signals

~~transmitting the analog multilevel signals over the optical channel~~.

2-4. (cancelled)

5. (previously presented) The method of claim 81 wherein equalizing the digital multilevel symbols comprises precoding the digital multilevel symbols using a dynamic limiting precoder.

6. (previously presented) The method of claim 1 wherein the information that is encoded comprises input bits and wherein encoding the information includes mapping the input bits into digital multilevel symbols.

7. (previously presented) The method of claim 1 wherein transmitting the analog multilevel signals over an optical channel comprises modulating the intensity of a light source according to the level of the analog multilevel signals.

8. (previously presented) The method of claim 1 wherein transmitting the analog multilevel signals over an optical channel comprises modulating laser intensity according to the level of the analog multilevel signals.

9. (currently amended) A method as in claim 81 wherein equalizing the digital multilevel symbols to compensate for the ~~laser and~~ channel characteristics comprises:

characterizing the channel; and

applying an inverse characterization of the channel to the digital multilevel symbols.

10. (cancelled)

11. (currently amended) A method ~~for high speed transmission~~ of transmitting data on an optical channel, the method comprising:

accepting information from a plurality of sources;

encoding the information via a plurality of trellis encoders ~~to produce a plurality of digital multilevel symbols~~;

mapping the encoded information into a plurality digital multilevel symbols via a plurality of symbol mappers, wherein the digital multilevel symbols are part of a pulse amplitude modulation (PAM) alphabet comprising at least three symbols;

converting the plurality of digital multilevel symbols into a plurality of analog multilevel signals; ~~and~~

~~transmitting the analog multilevel signals by~~ time division multiplexing the plurality of analog multilevel signals ~~onto an optical channel~~; and

modulating the intensity of a transmitting light source according to the level of the multiplexed analog multilevel signals.

12. (previously presented) A method as in claim 11 wherein the accepted information comprises input bits and wherein encoding the information comprises:

mapping the input bits into digital multilevel symbols.

13-15. (cancelled)

16. (currently amended) The method of claim ~~11~~ 84 wherein equalizing the digital multilevel symbols comprises precoding the digital multilevel symbols using a dynamic limiting precoder.

17. (cancelled)

18. (previously presented) The method of claim 11 wherein transmitting the analog multilevel signals over an optical channel comprises modulating the intensity of a light source according to the level of the analog multilevel signals.

19. (previously presented) The method of claim 11 wherein transmitting the analog multilevel signals over an optical channel comprises modulating laser intensity according to the level of the analog multilevel signals.

20. (previously presented) The method of claim 84 wherein equalizing the digital multilevel symbols to compensate for the laser and channel characteristics comprises:

characterizing the channel; and

using an inverse characterization of the channel to modify the digital multilevel symbols.

21. (cancelled)

22. (previously presented) The method of claim 11 wherein converting the plurality of digital multilevel symbols into a plurality of analog multilevel signals comprises:

accepting the plurality of multilevel symbols successively into a single analog to digital converter; and

successively converting the plurality of symbols into analog multilevel signals.

23. (previously presented) The method of claim 11 wherein converting the plurality of digital multilevel symbols into a plurality of analog multilevel signals comprises:

accepting the plurality of multilevel symbols successively into a plurality of analog to digital converters; and

converting the plurality of symbols into an analog representation; and

successively combining the analog multilevel signals into a succession of analog multilevel signals.

24-31.

32. (currently amended) An apparatus for transmitting information on an optical channel, the apparatus comprising:

a trellis encoder for accepting and encoding digital information; ~~and producing~~

a symbol mapper that maps the encoded information into digital multilevel signals, wherein the digital multilevel signals represent symbols that are part of a pulse amplitude modulation (PAM) alphabet comprising at least three symbols;

a digital-to-analog converter that accepts the ~~equalized~~ digital multilevel signals and produces analog multilevel signals; and

an analog signal to optical converter that ~~converts the multilevel analog signals to multilevel optical signal for coupling into an optical channel~~ modulates the intensity of a transmitting light source according to the level of the analog multilevel signals.

33-35. (cancelled)

36. (previously presented) An apparatus as in claim 87 wherein the equalizer is a dynamic limiting precoder.

37. (previously presented) An apparatus as in claim 32 wherein the analog signal to optical converter includes a laser.

38. (currently amended) An apparatus for concurrently transmitting a plurality of data signals over an optical channel, the apparatus comprising:

a plurality of trellis encoders that accept and encode a plurality of data signals; ~~and produce~~

a plurality of symbol mappers that map the plurality of encoded data signals into a plurality of digital multilevel signals, wherein the digital multilevel signals represent symbols that are part of a pulse amplitude modulation (PAM) alphabet comprising at least three symbols;

a converter that accepts the plurality of ~~equalized~~ digital multilevel signals and produces a plurality of analog multilevel signals; and

an optical source that receives the plurality of analog multilevel signals and produces a light output proportional to the level of successive analog multilevel signals for driving an optical channel.

39-40. (cancelled)

41. (previously presented) An apparatus as in claim 90 wherein the plurality of equalizers comprise at least one dynamic limiting precoder.

42. (currently amended) An apparatus for concurrently transmitting a plurality of data signals over an optical channel, the apparatus comprising:

a plurality of trellis encoders that accept and encode a plurality of data signals; ~~and produce~~

a plurality of symbol mappers that map the plurality of encoded data signals into a plurality of digital multilevel signals, wherein the digital multilevel signals represent symbols that are part of a pulse amplitude modulation (PAM) alphabet comprising at least three symbols;

a digital-to-analog converter that sequentially accepts the plurality of ~~equalized~~ digital multilevel signals and produces a plurality of sequential analog multilevel signals; and

an optical source that receives the plurality of analog multilevel signals ~~for driving an optical channel~~, wherein the intensity of the optical source is modulated according to the level of the analog multilevel signals.

43-44. (cancelled)

45. (previously presented) An apparatus as in claim 92 wherein the plurality of equalizers comprise at least one dynamic limiting precoder.

46-56. (cancelled)

57. (currently amended) A method of signaling over an optical channel, the method comprising:

accepting data from a source;

~~multilevel modulating~~ mapping the data into multilevel symbols according to a pulse amplitude modulation (PAM) scheme that employs at least three symbols that correspond to different signal levels;

~~coupling~~ transmitting the ~~multilevel modulated~~ data ~~into~~ on an optical channel by modulating the intensity of a light source according to the level of the multilevel symbols;

conveying the multilevel-modulated data over the optical channel;

accepting multilevel-modulated data from the optical channel;

demodulating the multilevel-modulated data accepted from the optical channel; and

providing the demodulated data to an interface.

58-59. (cancelled)

60. (previously presented) A method as in claim 94 wherein equalizing the data comprises applying a dynamic limiting precoding.

61. (currently amended) A method of signaling over an optical channel, the method comprising:

accepting data from a source;

~~multilevel-modulating~~ mapping the data into multilevel symbols according to a pulse amplitude modulation (PAM) scheme that employs at least three symbols that correspond to different signal levels;

~~coupling~~ transmitting the ~~multilevel-modulated~~ data ~~into~~ on an optical channel by modulating the intensity of a light source according to the level of the multilevel symbols;

conveying the multilevel-modulated data over the optical channel;

accepting multilevel-modulated data from the optical channel;

converting the multilevel-modulated data accepted from the optical channel to multilevel-modulated digital data;

demodulating the multilevel-modulated digital data accepted from the optical channel; and

providing the demodulated data to an interface.

62-63. (cancelled)

64. (previously presented) A method as in claim 96 wherein equalizing the data comprises applying a dynamic limiting precoding.

65-70. (cancelled)

71. (currently amended) An apparatus for concurrently transmitting a plurality of data signals over an optical channel, the apparatus comprising:

a plurality of pulse amplitude modulators that accept a plurality of data signals and produce a plurality of digital multilevel signals using a pulse amplitude modulation (PAM) scheme that employs at least three symbols that correspond to different signal levels;

a converter that accepts the plurality of digital multilevel signals and produces a plurality of analog multilevel signals; and

an optical source that receives the plurality of analog multilevel signals and produces a light output proportional to the level of successive analog multilevel signals for driving an optical channel.

72-73. (cancelled)

74. (previously presented) An apparatus as in claim 98 wherein the plurality of equalizers comprise at least one dynamic limiting precoder.

75-80. (cancelled)

81. (previously presented) The method of claim 1 further comprising equalizing the digital multilevel symbols to compensate for characteristics of the optical channel.

82. (currently amended) The method of claim 1 further comprising ~~of~~ equalizing the ~~analog~~ multilevel symbols to compensate for characteristics of the optical channel.

83. (previously presented) The method of claim 81 wherein equalizing the digital multilevel symbols comprises preceding the digital multilevel symbols using a Tomlinson-Harashima precoder.

84. (previously presented) The method of claim 11 further comprising equalizing the plurality of digital multilevel symbols to compensate for characteristics of the optical channel.

85. (currently amended) The method of claim 11 further comprising equalizing the plurality of ~~analog~~ multilevel symbols to compensate for characteristics of the optical channel.

86. (previously presented) The method of claim 84 wherein equalizing the digital multilevel symbols comprises preceding the plurality of digital multilevel symbols using a Tomlinson-Harashima precoder.

87. (previously presented) The apparatus of claim 32 further comprising an equalizer that accepts the digital multilevel signals and produces equalized digital multilevel signals prior to coupling into the digital-to-analog converter.

88. (currently amended) The apparatus of claim 32 further comprising an equalizer that accepts the ~~analog~~ multilevel signals and produces equalized ~~analog~~ multilevel signals.

89. (previously presented) An apparatus as in claim 87 wherein the equalizer is a Tomlinson-Harashima precoder.

90. (previously presented) An apparatus as in claim 38 further comprising a plurality of equalizers that accept the plurality of digital multilevel signals and produce a plurality of equalized digital multilevel signals to provide to the converter.

91. (previously presented) An apparatus as in claim 90 wherein the plurality of equalizers comprise a plurality of Tomlinson-Harashima precoders.

92. (previously presented) An apparatus as in claim 42 further comprising a plurality of equalizers that accept the plurality of digital multilevel signals and produce a plurality of digital multilevel signals.

93. (previously presented) An apparatus as in claim 92 wherein the plurality of equalizers comprise a plurality of Tomlinson-Harashima precoders.

94. (previously presented) A method as in claim 57 further comprising equalizing the data after multilevel modulating the data.

95. (previously presented) A method as in claim 94 wherein equalizing the data comprises applying a Tomlinson-Harashima precoding to the data.

96. (previously presented) A method as in claim 61 further comprising equalizing the data after multilevel modulating the data.

97. (previously presented) A method as in claim 96 wherein equalizing the data comprises applying a Tomlinson-Harashima precoding to the data.

98. (previously presented) An apparatus as in claim 71 further comprising a plurality of equalizers that accept the plurality of digital signals and produce a plurality of equalized digital signals to provide to the converter.

99. (previously presented) An apparatus as in claim 98 wherein the plurality of equalizers comprise a plurality of Tomlinson-Harashima precoders.

100. (new) The method of claim 1 wherein the digital multilevel symbols are part of a pulse amplitude modulation (PAM) alphabet comprising at least five symbols.

101. (new) The method of claim 100 wherein the digital multilevel symbols are part of a PAM-5 alphabet having five symbols.

102. (new) The method of claim 11 wherein the digital multilevel symbols are part of a pulse amplitude modulation (PAM) alphabet comprising at least five symbols.

103. (new) The method of claim 102 wherein the digital multilevel symbols are part of a PAM-5 alphabet having five symbols.

104. (new) The apparatus of claim 32 wherein the digital multilevel signals represent symbols that are part of a pulse amplitude modulation (PAM) alphabet comprising at least five symbols.

105. (new) The apparatus of claim 104 wherein the digital multilevel signals represent symbols that are part of a PAM-5 alphabet having five symbols.

106. (new) The apparatus of claim 38 wherein the digital multilevel signals represent symbols that are part of a pulse amplitude modulation (PAM) alphabet comprising at least five symbols.

107. (new) The apparatus of claim 106 wherein the digital multilevel signals represent symbols that are part of a PAM-5 alphabet having five symbols.

108. (new) The apparatus of claim 42 wherein the digital multilevel signals represent symbols that are part of a pulse amplitude modulation (PAM) alphabet comprising at least five symbols.

109. (new) The apparatus of claim 108 wherein the digital multilevel signals represent symbols that are part of a PAM-5 alphabet having five symbols.

110. (new) The method of claim 57 wherein the data is mapped into multilevel symbols according to a pulse amplitude modulation (PAM) scheme that employs at least five symbols that correspond to different signal levels.

111. (new) The method of claim 110 wherein the data is mapped into multilevel symbols according to a pulse PAM-5 scheme that employs five symbols that correspond to different signal levels.

112. (new) The method of claim 61 wherein the data is mapped into multilevel symbols according to a pulse amplitude modulation (PAM) scheme that employs at least five symbols that correspond to different signal levels.

113. (new) The method of claim 112 wherein the data is mapped into multilevel symbols according to a pulse PAM-5 scheme that employs five symbols that correspond to different signal levels.

114. (new) The apparatus of claim 71 wherein the plurality of pulse amplitude modulators use a pulse amplitude modulation (PAM) scheme that employs at least five symbols that correspond to different signal levels.

115. (new) The apparatus of claim 114 wherein the plurality of pulse amplitude modulators use a PAM-5 scheme that employs five symbols that correspond to different signal levels.